

CLAIMS

1. Method for monitoring movable parts of a machine, such as an industrial robot wherein measured values of at least two different measured quantities are detected and at least one of these measured values is processed to a first measure result in such a way that it is comparable with the measured value of another measured quantity or a second measure result obtained as a result thereof, that the first measure result is compared with the measured value of another measured quantity or a measure result obtained as a result thereof and that a signal characterizing the comparison result is provided.
2. Method according to the preamble of claim 1, particularly according to claim 1, wherein material strains on parts of the machine are measured as at least one measured quantity.
3. Method according to claim 2, wherein the material strains are measured by means of at least one transducer (8).
4. Method according to claim 2, wherein the material strains are measured by means of a strain gauge (8).
5. Method according to claim 2, wherein the material strains are measured by means of piezoelectric or light guide-based pickups.
6. Method according to claim 1, wherein the material strains are measured by means of transducers (8) positioned on at least two surfaces of a robot part.
7. Method according to claim 1, wherein actual measured values of measured quantities or results are compared with reference values.

8. Method according to claim 7, wherein actual measured values of measured quantities and/or measure results are compared with reference values, whilst taking account of tolerances.

9. Method according to claim 8, wherein tolerances are taken into account by forming a reference corridor to a reference curve.

10. Method according to claim 1, wherein in the case of divergences from expected measured values and/or measure results, the robot is stopped.

11. Machine with movable parts, such as in particular an industrial robot, characterized by at least two measuring devices for detecting different measured quantities as measured values on movable parts of the machine, at least one processing unit (12, 13, 14) for at least one measured value of a measured quantity for processing the same into a first measure result comparable with another measured value of another measured quantity or a second measure result obtained therefrom and by a comparison unit (15) for comparing the first measure result with at least the measured value of another measured quantity or a second measure result obtained as a result thereof.

12. Machine according to the preamble of claim 11, particularly according to claim 11, characterized by measuring devices (8) for determining material strains.

13. Machine according to claim 12, wherein the devices for determining material strains are constructed as transducers.

14. Machine according to claim 12, wherein the devices for determining material strains are constructed as strain gauges.

15. Machine according to claim 12, wherein the devices for determining material strains are constructed as light guide-based pickups.

16. Machine according to claim 12, wherein in each case at least one device for determining material strains is placed on at least two surfaces of a robot part.

17. Machine according to claim 12, characterized by a monitoring device (11) to which is connected at least one device for determining material strains on machine parts.

18. Machine according to claim 16, wherein the monitoring device (11) has units for monitoring at least elongations of the machine structure and a further measured quantity.

19. Machine according to claim 16, wherein the monitoring device (11) has a comparison device (15) for comparing actual measured values and/or measure results with predetermined models for robot movements (16).

20. Machine according to claim 18, wherein the monitoring device has a device (17) for disconnecting the machine.